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## ORIGINAL ARTICLES.

I—THE BACILLUS PNEUMONÆ FOUND IN A CASE OF CONJUNCTIVITIS.

II—THE BACILLUS PYOCANEUS FOUND IN A CASE OF CONJUNCTIVITIS.

III—BLANK CARTRIDGE WOUND OF THE EYE: PANOPHTHALMITIS, PROBABLY DUE TO BACILLUS.

By GEORGE S. DERBY, M.D.

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(From the Laboratory of the Massachusetts Charitable Eye and Ear Infirmary. Dr. F. H. Verhoeff, Director.)

CASE I.—E. M., aged 58, a healthy American woman, came under the care of the writer at St. Elizabeth's Hospital on February 24th, 1904. About one month previously she had "caught cold" in her left eye. It had become reddened, there was a slight swelling of the lids and considerable whitish discharge; the lids were stuck together in the mornings. She consulted a doctor and was given a 15 per cent. solution of argyrol to instill twice a day. This relieved the symptoms somewhat, but the discharge continued and the eye still remained red. Examination of the left eye showed moderate injection of the bulba conjunctiva; cornea iris, media and fundus normal. Exposure of the lower cul-de-sac disclosed a considerable quantity of thick, creamy, purulent looking fluid;

the conjunctiva was considerably injected and thickened, there was no follicular hypertrophy. Eversion of the upper lid showed a like condition of the upper-cul-de-sac. The lachrymal sac was apparently unaffected, the naso-lachrymal duct was patent; right eye normal.

During the two weeks following the patient was treated every second day in the clinic with a weak solution of corrosive sublimate and careful cleansing of the conjunctiva; the eye was washed out several times a day at home. Later, applications, first of powdered boric acid, then of iodoform, were made and all without the slightest effect on the progress. She was then sent to the rhinologist, who found a cystic turbinate with an accompanying rhinitis and probable involvement of the ethmoidal cells. The turbinate was removed and the nose cleansed frequently, which seemed to have a favorable effect on the conjunctivitis. Nevertheless the latter did not entirely disappear, and when the patient was last seen, after two months of treatment, there was still a considerable amount of conjunctival injection and discharge, although she had attended the clinic faithfully and the most varied remedies had been tried.

At the first visit a smear was made from the discharge and stained by Gram. The discharge consisted of pus corpuscles and cell detritus, and contained a large number of moderate sized gram-negative bacilli, which were often arranged in pairs, end to end. These bacilli were surrounded by a wide mucoid capsule. Cultures were then made on agar, blood serum and potato.

No. 1. Agar slant. After 36 hours in the thermostat, several large, round, elevated, whitish-gray colonies could be seen, the largest one measuring about 2mm. in diameter. They were soft and could be drawn out into a viscid string with the platinum wire. At the end of 80 hours the whole surface of the agar was overgrown with the colonies which had coalesced.

2. Agar stab. After 36 hours in thermostat, thick, white, translucent nail growth. Later, gas formation.

3. Potato. After 36 hours in thermostat, thin, pale, colorless viscid layer.

4. Blood serum. Kept at room temperature. In 24

hours a number of fairly large, elevated, drop-like, highly refractive colonies, which grew rapidly and later coalesced.

Smears from these cultures showed but one type of organism, a moderate sized bacillus, similar to the one obtained in smears from the discharge. They averaged 1 to 2 inches in length and were half as broad as long; they were sometimes arranged in pairs, end to end, were surrounded by a mucoid zone, did not form spores and were non-motile. They were decolorized by Gram, and occasionally the mucoid capsule could be brought out well by counterstaining with eosin (W. H. Smith), though this was much less apparent in the culture organisms than in those taken direct from the conjunctiva. To test their virulence, 15 minims of a four days' bouillon culture, which showed comparatively few organisms under the microscope, was injected into the peritoneal cavity of a guinea pig. Death occurred in 30 hours from general peritonitis. Pure cultures of this bacillus were obtained from the peritoneal fluid, from the liver surface and from the blood.

As this bacillus coincides in its morphology, staining reaction, cultural characteristics and pathogenicity with the bacillus pneumoniæ of Friedländer it must be regarded as identical with that organism. As no other bacteria could be demonstrated in the smears and cultures at any time during observation of the case, it may be regarded as the cause of the conjunctivitis.

Friedländer's bacillus, although uncommon in the bacteriology of the eye, has been found in cases of ocular infection by a number of investigators, notably by Gourfein (*Revue méd. de la Suisse Romande*, février, 1902), who obtained it 23 times out of 450 cases, a far greater percentage than others have reported. Out of about 150 cases of conjunctivitis examined bacteriologically during the past year, the writer has found it only in the above case.

A resumé of the ocular conditions in which it has been observed includes blenorrhœa neonatorum, acute catarrhal conjunctivitis in which the symptoms may be intense, acute conjunctivitis with subconjunctival hæmorrhages, subacute conjunctivitis with or without ulcerative blepharitis. Also in follicular hypertrophy and in pseudo-membranous conjunctivitis. Apparently in none of the above conditions was any particular

resistance to treatment shown, the duration seldom being over ten days, while in the case described here, although the symptoms were at no time severe, resistance to the usual remedies was marked. This bacillus has also been found in more serious processes, notably in kerato-malacia, in corneal ulcer with hypopyon and also in the contents of chalazia. There have been a number of cases of dacryocystitis reported and the tear sac appears to be prone to infection by this organism. As yet no epidemics have been observed and no instance of contagion from one person to another. By inoculation of virulent cultures it is possible to produce severe corneal ulcers in animals, and injection of the bacilli into the anterior chamber or vitreous, will cause a severe panophthalmitis.

CASE II.—H. H., a healthy male baby, three weeks old, was brought to the Massachusetts Charitable Eye and Ear Infirmary on March 8th, 1904. Soon after his birth his mother had noticed a slight swelling of the lids and a moderate amount of discharge, both eyes being affected. Examination showed a well developed and healthy child. There was a moderate swelling of the upper and lower lids of both eyes with considerable reddening of the margins and slight conjunctival injection. There was a certain amount of thin muco-purulent discharge. Corneæ and irides normal. A 15 per cent. solution of argyrol was prescribed and the mother was instructed to bring the child in the next day for observation. She did not return.

Several smears had been made from the discharge and one blood-serum tube had been inoculated. The smears, stained by Gram, showed a few Gram-positive cocci, an occasional, moderate sized gram-positive bacillus (resembling the *Xerosis bacillus*), and a number of small, slightly curved, gram-negative bacilli with rounded ends, which lay, for the most part, outside the cells.

The blood-serum culture at the end of 48 hours showed a large number of the round orange-colored colonies of the *staphylococcus aureus*, and a few round, greenish-yellow, slightly sunken colonies of moderate size. From one of these an agar tube was inoculated. Over the surface of this a moist greenish white layer developed and the agar took on a



brilliant green color. The growth was profuse and spread rapidly. Smears showed the same Gram-negative, small, slightly curved bacilli, sometimes arranged in chains of two or three. In all respects they were typical of the pyocyaneus group. Unfortunately, before a virulence test could be made, the cultures were killed by an overheated thermostat.

Whether the conjunctivitis in this case was due to the bacillus pyocyaneus cannot be decided with certainty, as the virulence of this particular strain was not tested; nor do we know how virulent was the staphylococcus which was also present. However, the latest writers tend to minimize the importance of staphylococci in the conjunctival sac, and we know that the pyocyaneus may cause certain ocular infections, notably, keratitis with hypopyon and dacryocystitis. In any case the finding of this organism is an interesting and rare occurrence, as it has seldom been observed in connection with the eye.

CASE III.—The history, examination and clinical course of the following case have been taken from the house records of the Massachusetts Charitable Eye and Ear Infirmary.

T. S., aged 19, came to the Infirmary on August 27th, 1903. About two hours previous to his coming, he had been struck in the left eye by the wad of a blank cartridge, which caused severe pain and loss of vision. Examination showed a severe powder burn of the left eyelids. The conjunctiva was markedly injected and pitted with grains of powder. In the lower outer part of the cornea extending into the sclera was a jagged T-shaped wound, the upright arm about 8 mm. in length, the cross bar 4 mm. The anterior chamber was nearly filled with blood, the iris was hardly visible. The edges of the wound bulged outward. T.—3. The fundus could not be seen. Thirty-six hours after entrance all the signs of an acute panophthalmitis were present, and 12 hours later the eye was enucleated. No subsequent complications.

The globe was fixed in formalin, was frozen and halved, and turned over to the writer for pathological examination. Macroscopically there could be seen lying in the anterior part of the eye just behind the wound, a large, square, brownish mass, 7 cm. long by 8 broad, and showing coarse striations (the wad). The greater part of the lens and vitreous had

disappeared; the retina was completely separated from the choroid by blood clots.

The eye was then put through ascending grades of alcohol, imbedded in celloidin, and microscopic sections made.

Microscopical examination gave the ordinary picture of an acute panophthalmitis. The foreign body, which was composed of coarse, refractile, intertwining fibers, was surrounded, except anteriorly, where it was in contact with the posterior surface of the cornea and sclera, by the remnants of the vitreous and a mass of purulent exudate. The anterior chamber contained blood and pus corpuscles. The iris and ciliary body in the neighborhood of the wound had disappeared. There were large extravasations of blood in front of the retina, between it and the choroid and behind the choroid. The cornea, ciliary body, choroid, retina and papilla were densely infiltrated with pus cells.

Sections were stained for bacteria by Gram, Gram-Weigert, carbol-fuchsin and methylene blue, with the following result: Lying in the remnants of the vitreous and in the purulent exudate which surrounded the foreign body, were numerous large bacilli, which could also be demonstrated, although in smaller numbers, between the fibres of the wad, in the cornea adjacent to the wound, in the retina, and in the choroid. A few Gram-positive cocci resembling staphylococci were also found in one small area of the exudate.

The bacilli were large and thick, with rounded ends; they stained unevenly and showed spore formation. The largest forms measured slightly over 5 microns in length and 1.5 microns in breadth, but many were considerably shorter. They formed chains occasionally; did not lie within the cells; stained well as a rule by Gram, but were decolorized by the prolonged use of alcohol. No capsule could be made out.

Although it is impossible, in the absence of cultures, to say definitely that this bacillus was the cause of the panophthalmitis, yet its presence in the wad and in the surrounding exudate and vitreous, the scarcity of other micro-organism, and its numerical superiority, would lead one to suppose such to be the case. Its identity can only be surmised, but it is suggestive to note that in morphological characteristics,

pathogenicity and evident preference for the vitreous as a favorable soil for development, it shows a marked resemblance to the common hay bacillus (*bacillus subtilis*).

This organism, which is of exceedingly common occurrence in nature, was until recently considered to be a non-pathogenic saprophyte. The first case of acute infection caused by it was reported at the Heidelberg Congress of 1902 by Baenziger and Silberschmidt. It was that of a man whose eye had been penetrated by a metal chip from an agricultural implement. An extremely acute panophthalmitis followed; the eye was enucleated, and a virulent hay bacillus was obtained from the cultures, which produced a similar process when injected into the vitreous of animals. Likewise from the ground which the patient tilled this same virulent organism was isolated. Since then several other cases have been reported and additional light has been thrown on the nature of the process.

It appears that the vitreous both of man and of animals forms a peculiarly favorable culture media for this special pathogenic strain of hay bacillus, while other strains may be regarded as practically non-pathogenic. Most of the cases have been reported from Switzerland and the surrounding territory, and have occurred as a rule among tillers of the soil. Infection has followed the penetration of a foreign body into the vitreous and has been of an especially acute nature.

The identity of the organism found in the case reported above could not be settled beyond doubt. However, it resembled the hay bacillus closely, while the process was also typical of that organism. As the hay bacillus is one of the commonest micro-organisms found in nature, its presence in a blank cartridge wad would not be surprising. Then, too, bacilli have been found but seldom in the acute, destructive inflammations of the eye, and no one of the organisms described bears as close a resemblance to our bacillus as does the *bacillus subtilis*.

In regard to other ocular lesions produced by the bacillus, Gourfein has recently reported seventeen cases of conjunctivitis apparently due to this organism, in two of which there were corneal complications.

My thanks are due to Dr. F. H. Verhoeff for the opportunity to examine the eyeball in Case III, and also for kindly looking over this paper.

#### REFERENCES.

It has been thought unnecessary to review the literature of the three subjects considered, since it is brought up to 1903 in Axenfeld's admirable article, "Specielle Bakteriologie des Auges," in the *Handbuch der Pathogenen Mikroorganismen*, edited by Kolle & Wasserman.

A later article on the bacillus pyocyaneus is that of McNab, *Klin. Monatsbl.*, 1904, p. 65.

Gourfein's article on the bacillus subtilis, which brings the literature of the subject up to date, will be found in the Report of the Tenth International Ophthalmological Congress, Lucerne, 1904.

### COMPLICATIONS FOLLOWING CATARACT EXTRACTION IN GLAUCOMA.\*

By DR. LOUIS J. GOUX,

DETROIT, MICH.

THE object the author has in presenting his experience in one case of cataract extraction in a glaucomatous eye is to not only relate the history of this particular case, which is at least to say unusual and fortunately uncommon, but also to gather an expression from the members of this Society of similar experiences, and to learn as far as possible the best way of handling these cases as regards prophylaxis and after treatment.

Report of case.—Miss W., aged 60 years, inmate Eastern Michigan Asylum, Pontiac, Michigan, first examined October 20th, 1903. Complains of great pain in eyes with nocturnal exacerbation; vision greatly impaired.

Objective symptoms, injected ocular conjunctivæ, steamy cornea, shallow anterior chambers, oval dilated pupils. Media clear. Tension plus 2 in right and plus 3 in left.

Treatment, dionin and eserine.

February 16th, 1904 —Lenticular opacities in left eye, media clear in right. Tension diminished and eyes less painful.

April 19th, 1904.—Complete cataract in left eye. Ten-

\* Read at the 9th meeting of the American Academy of Ophthalmology and Oto-Laryngology held at Denver, Aug. 24th to 26th, 1904.



sion plus 2, very shallow anterior chamber. Right eye more comfortable, tension plus 1.

The eyes being in a more comfortable condition than they had been for months, on May 10th it was decided to do an iridectomy and cataract extraction in hope of relieving the glaucoma and restoring vision in left eye. Operation performed under cocaine anæsthesia. Interocular pressure was so great that as the primary incision was completed the lens followed knife through the wound and immediately there was a considerable escape of vireous.

The lens had been delivered by intra-ocular pressure and collapse of eyeball was so complete that after vitreous had been removed from wound dressings were applied, no attempt being made to perform iridectomy.

Patient was placed in bed, morphine used hypodermically and special attendant provided to carry out instructions. About two hours after operation, patient had intra-ocular hæmorrhage, about a drachm of clotted blood being found under dressings. Wound was again wiped dry and no further untoward symptoms were complained of or were noticed objectively until the fourth day, when the dressings were noticed to be wet with a serous exudate. Examination revealed a very small sinus located at the apex of corneal cicatrix.

Dionin and eserine were again ordered, but after about two weeks all medication was discontinued.

At the present time the vicarious channel still exists, vision is nil, and the eye is evidently doomed to pthisis bulbi.

The experience suggests the following query, viz: "Was there any prophylactic or ante-operative measures other than medicative that would possibly have changed the result?" To the writer the most logical prophylactic measure that suggests itself is that of scleral puncture (posterior sclerotomy). By means of this simple operation the tension of the eyeball can be sufficiently reduced so as to bring about a return of anatomical relations of the parts, making the steps of iridectomy and extraction as easily performed as under normal conditions. For this prophylactic measure it is claimed that in cases of high tension the iridectomy can be much more thoroughly performed when preceded by this precautionary measure.

According to Priestley Smith the results of iridectomy in glaucoma depend largely upon the mode of performing the operation, and he points out the advantage of scleral puncture before the knife enters the anterior chamber.

The development of cataract in this case was clearly dependent upon impaired lenticular nutrition, due apparently to excessive intra-ocular pressure.

The other eye has not developed cataract, at no time has the tension been as high as in operated eye, and at present time is about plus 1 or less.

The chances are that intra-ocular hæmorrhage was unavoidable and that no prophylactic measure would have changed this phase of the situation.

The cicatricial fistula furnished an interesting illustration of nature's attempt to relieve the situation by means of vicarious infiltration.

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REMARKS ON THE NEED FOR THOROUGH ASEPTIC  
AND ANTISEPTIC WORK PRIOR TO, DURING,  
AND AFTER CUTTING OPERATIONS ON THE EYE BALL.\*

BY DR. B. E. FRYER,

KANSAS CITY, MO.

WHILE the questions of antisepsis and asepsis in general surgical work are problems quite far from a perfect solution, and dwelling, as these questions do, in the mind of every general surgeon more or less continually, with the resultant hope of attaining nearer to a perfection of technique, it must be said that in general surgery there is, as is well known, more or less continual development and improvement in these important adjuncts to surgical success. Moreover, every careful general surgeon, as a rule, understands the many factors required for asepsis, which I fear is not the case with a large number of ophthalmologists, if the writer can judge by the literature made by oculists on ocular asepsis, or by his

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\*Read at the 9th meeting of the American Academy of Ophthalmology and Oto-Laryngology held at Denver, August 24th to 26th, 1904.

experience in medical societies and conferring with ophthalmic surgeons generally.

In this brief paper I propose very concisely to set forth the need for a greater effort to obtain an aseptic condition for eye surgical operations and also to call attention to some of the main factors needed for successful work in this direction, and moreover, to show that those who are inclined to doubt or who do actually doubt the possibility of any eye asepsis being made at all possible, are in error.

It is conceded, of course, that many of the well known bacteria which are found in normal conjunctiva, live there without the production of any palpable pathologic change or lesion so long as no wound or abrasion exists, but that others of these microbes require no epithelial denudation prior to their destructive working. Moreover, very many bacteria succeed in their destructive doings in a direct ratio with diminished systemic resistance of an individual, plus local lessened resistance, caused by traumatism of any or all kinds.

It is not necessary in this paper to mention in detail the various pathogenic bacteria which are found in the conjunctival sac; they are well known, though it is, of course, possible that pathogenic microbes may be hereafter discovered which are at present unknown and which are generally of unsuspected existence. The habitat of all them is not alone in the conjunctiva proper, but in the glandular openings and follicles, of which there are many in the inner lid surface and which our colleague, Alt, has shown in his excellent work very fully, as he has also shown the existence of accessory lachrymal glands in the lids. Of course, too, the puncta are the avenues from the nares for admission of septic germs. Moreover the Meibomian glands and the bulbs of the eye lashes, the edges and free eye lid surfaces are also sites and hiding, and probably breeding places of these pathogenic workers. The sites as above given are, I admit, generally known, but just as to where in them the bacteria lodge, I believe is neither generally known or understood. In other words, these sepsis producers live and work not only on the external epithelial surfaces, but in and between the epithelial cells, of which latter we have in the conjunctival sac and its appendages and surroundings many differing from each other

morphologically, and also as to the amount of cement substance surrounding each cell and attaching it laterally to its neighboring cell and also to those of the layers beneath, where such lower layer or layers exist.

These facts have a very direct and practical bearing on the production of any aseptic conditions for our line of work. For if the microbial life in the conjunctiva and its appendages inhabited only the surfaces of this mucus membrane and was not found also enjoying a flourishing existence between and under the epithelial cells, the question of inhibition, expulsion and death of this microbial activity might be a much easier and simpler matter.

In order to fully appreciate the need for antiseptic work prior to eye operations, it is well to state that the whole subject of inflammations should be restudied, late pathological experimental work, showing that inflammation processes in their completeness mean that sepsis has preceded them, that either a local septic or a general toxic cause has produced the condition, and that a local trauma or irritant will not, cannot alone produce the full conditions now understood as inflammation. For the eye we may instance as a local septic cause the various pathogenic bacteria as productive of iridocyclitis with the aid of trauma, or of syphilitic or rheumatic iritis from a general and systemic toxin, as the etiologic factors without trauma. It will not do then, if this is true, to assign as a cause of an unsuccessful eye operation the trauma alone, as is generally done by oculists who do not precede their operations with antiseptic precautions and efforts.

It is conceded that many operations on the eye are done and have been done successfully when no attempt has been made toward asepsis, and from this it is argued by some that none is necessary. And while it is true as following eye surgery as it is also true of general surgery, that success has occasionally resulted where no antiseptic attempts were made, still no general surgeon now will believe that any antiseptic efforts should be relaxed, but that operative successes without antiseptic precautions are simply due to the fact that a certain but limited amount of septic material may be met, destroyed and provided for by systemic antitoxins. But this auto-antitoxic neutralization of septic matter is probably less likely to



be available for work in the eye from the different anatomical conditions, and at the same time there is apt to be more destructive effect to the usefulness of the visual organ than occurs from sepsis of a less important function or viscus elsewhere.

It is of interest to the operator to consider that sepsis may gain admittance from local sources: First, from ante-operating factors, such as corneal ulcerations or wounds giving sepsis admittance; second, from septic material introduced at the time of an operation; or, third, as a post operative result from meddling of patient with dressings, or by operator if the latter does not follow antiseptic rules in the after-treatment. It is our duty to try and shut off the septic approach through any of the before-mentioned avenues or modes by every safe method we possess.

Now a few words as to what I consider the best method of safely rendering the field of operation in eye surgery free from septic material. Having tried several germicides in preparing eyes for operation, I have come to the conclusion that at present no known drug or preparation equals argyrol for the purpose. It is most efficient as a destructive of microbial life, without in the least injuring the eye ball or its appendages. This is the first requirement for eye antisepsis, but in addition its permeability and penetration are most remarkable, thus not only destroying microbes which may be on the conjunctival surface, but also going between epithelial cells and even below the first layer of these cells. Argyrol also passes readily through the puncta lachrymalia and into the glandular crypts and follicles, and into the nasal ducts. I use argyrol in thirty per cent solution.

I will give an outline of the method I pursue in the antiseptic preparation of an eye for operation. The face, brow, temple and eyelids are carefully washed with soap and water; after this the same regions are cleansed with a two per cent. solution of carbolic acid. This is thoroughly done, and especial care is had in rendering the lids and their free edges absolutely clean. Then a few drops of a thirty per cent. solution of argyrol is instilled into the conjunctival sac, the eye closed and a sterile gauze dressing of several layers dipped into the carbolic acid solution is applied to the eye, which

dressing is large enough to cover the eyebrow, temple edge and the upper part of the nose of the same side, and also cover the upper cheek surface, and this dressing is retained in position with ising glass plaster; no bandage is applied. This dressing is changed each day, and each day the argyrol solution is instilled, the patient being watched to see that the dressing is not disturbed or the eye rubbed. The number of days required for the complete antiseptic preparation varies, of course; it may take a week or even three. Should there be any nasal disease the nares are sprayed with a solution of iodine in liquid vasaline daily.

If this method is followed carefully and kept up long enough it will result in the production of an antiseptic interval of the conjunctival sac—an interval sufficiently long enough for the closing of any wound or incision, and that without any disturbance of nutrition. After an operation the dressing is generally not changed for forty-eight hours, and when changed the work is done under antiseptic precautions, and before applying a new dressing argyrol is instilled if necessary. No bandage or shield is applied mainly for the reason that with a bandage any change of position of the patient's head upon the pillow will displace the dressing.

I insist in my capital operations that a careful nurse shall be in attendance and watch the patient day and night to prevent any interference with the dressing on the eye. This last precaution should in no case be omitted.

It cannot be necessary to say that the most scrupulous care is necessary to render all the instruments used absolutely sterile, and also that the hands of the operator and assistants are so. Moreover, before the operator's and assistants' mouth a gauze cover is applied.

In every case of a capital nature, too, the general health and condition are seen to and the urine carefully examined.

REMOVAL OF THE ANTERIOR CAPSULE AND THE  
HYPODERMATIC USE OF MORPHIA IN  
SIMPLE EXTRACTION.

By EUGENE SMITH,  
DETROIT.

THE SAFEST OPERATION FOR SENILE CATARACT.

By H. GIFFORD,  
OMAHA.

COMPLICATIONS FOLLOWING CATARACT EX-  
TRACTION IN GLAUCOMA.

By LOUIS J. GOUX,  
DETROIT.

REMARKS ON THE NEED FOR THOROUGH ASEP-  
TIC AND ANTISEPTIC WORK PRIOR TO, DUR-  
ING AND AFTER CUTTING OPERATIONS  
ON THE EYEBALL.

By B. E. FRYER,  
KANSAS CITY.  
DISCUSSION.

J. M. RAY (Louisville, Ky.): The papers we have just listened to have presented such a quantity of material for discussion, it seems difficult to know exactly where to begin a consideration of the questions. The paper by Dr. Smith, in which I was very much interested, brings up the question we are all much interested in of how to deal with the capsule in cataract operations.

There is no question but what the best method of dealing with it has not yet been settled, and a great many of the most serious complications met with in cataract have been those resulting from secondary operation, so I look on it with much trepidation and concern. Twenty years ago I saw DeWecker doing the operation of removal of the capsule by a pair of forceps similar to those of Dr. Smith. In my experience it does not bring away the capsule in every instance. A great many cases fail to make more than simply a number of rents in the capsule.

In a certain number of cases I believe it can be removed, and when this is done there is no question but what the for-

mation of a secondary membrane is materially lessened but not done away with entirely.

The great trouble in using morphia as suggested by the essayist, is the danger from nausea. Heroin, however, is one of the morphine series which can be used with less danger of nausea. I do not think it would, however, have the same effect as a myotic.

In regard to the cataract incision, I am a believer in the small conjunctival flap. The ideal incision is in the sclero-corneal margin and with a small conjunctival flap. The trouble with the operation of Dr. Gifford, is that on drawing his suture, the pressure is near the center of the cornea, and thus causes the wound to gap, and therefore you will have as many, or more, prolapses, as when done with the small flap without sutures.

I believe when we have large wounds of the cornea, the purse string suture is ideal, it lessens infection, and we can save a great many more eyes with extensive wounds than by any other method.

The question of what is the best operation for cataract I presume will never be settled to the satisfaction of every one. If it were not for the prolapse, the simple extraction would undoubtedly be the operation. I have never been able to get results I hear of others getting. Frequently I have a prolapse and trouble with it. I always sleep sounder the first night after I do a cataract operation if I do an iridectomy.

DUDLEY S. REYNOLDS, Louisville, Ky.: The difficulty in dealing with the capsule has been constantly before my mind, as it has that of others. In 1876 I reported some extractions done by peripheral incision of the capsule, which Dr. Knapp, who was present at the time, kindly appropriated without reference to me. He is welcome, however, as I abandoned it long ago. I have acquired the habit of using almost exclusively the Beers knife. I make the corneo-scleral puncture, pass the knife into the center of the pupillary area and pass down as low as possible in contact with the anterior capsul, and with a slight motion of the hand cause the point of the knife to go through the capsule. Sometimes it goes through making a little flap, and then I make the counter puncture of the corneo-scleral junction so



as to have a small conjunctival flap. I believe this, as a general proposition, in uncomplicated cases, the best procedure. I never use fixation forceps. I always rely upon cocaine anesthesia. The stitch in the flap was first used by Henry W. Williams, father of our colleague Chas. H. W. He first used a single stitch, which he put in the center of the flap and which he used more than forty years ago, and he continued to use this up to the time of his death. That was a comparatively simple stitch, and I employed it a number of times myself and it caused such irritation in the eye that I abandoned it. The question of the danger from prolapsus has, it seems to me, been clearly stated by Dr. Ray. I should fear to use the dressing he mentions because of the gapping in the wound. As to prolapse of the iris, after extraction, I am entirely convinced it is due to faulty dressing. A dressing which causes the least possible pressure, or no pressure at all, is the ideal one. As to the bandage, I think I am on record more than twenty-five years ago against it. I do not use the isinglass dressing. I use gauze, a single thickness, smeared with petroleum and laid over the lash. I spread a little cotton wool so as to fill up some of the inequalities, and then lay a series of narrow strips of plaster to completely cover the eye and at the same time so loose as to make it impossible to have pressure. In the case of a prominent eye and low brow and cheek where I find it difficult to cover the eye without making pressure, I lay the strips along the nose and temporal side without crossing the center except with the gauze. I do not always do the simple operation, but I do so if I can. Iridectomy is a wound sometimes fraught with grave consequences, and I think it is not a desirable complication to add to cataract extraction.

H. V. WURDEMANN, Milwaukee: I take issue with my esteemed friend on the subject of the simple operation. I have made a great many such experiments; all my simple operations have been experiments, and it has taken me several hundred to learn not to do such in the future. My successes in simple extraction in securing perfectly round pupils are perhaps ten per cent. I am ambidextrous and my nerves are fairly good. As regards these flap operations, to those of you who make the Snellen flap—perhaps, too, those

who do the other forms of operation these will not appeal, except where we have wounds of the cornea, or where we have inflammation, as I have made it following Dr. Ellet's suggestion and Dr. Gifford's work, of which I heard a year ago. The Snellen flap made in cataract extraction is the small conjunctival flap; the healing begins immediately, and on the next day the flap is fully adherent. We have no trouble from bleeding since the advent of adrenalin. I always have a stitch ready, using the Williams method, but do not put it in always. In vitreous prolapse I always put in the stitch, not necessarily through the corneal edge of the wound, because I, as a rule, have a sufficiently large coadjunctive flap in which to insert the stitch, and have never after the operation found any vitreous prolapse in almost one thousand extractions. They occur during the operation, and are due either to the maneuvers of the operator or to the movements of the patient. I am much pleased to advocate Dr. Fryer's method in the preliminary preparation of the patient. I insist, even in public practice, that there should be at least twenty-four hours preparation. I have pinned my faith to argyrol and have not been disappointed.

J. J. KYLE, Indianapolis, Ind.: It is a fact that the greater the trauma the greater the liability to infection. I believe with Dr. Reynolds, we can do away with the fixation forceps and thus lessen trauma and therefore danger of infection. I believe that the best results I have had were with the small conjunctival flap. As Dr. Wurdemann says, the adherence takes place within twenty-four hours, and you thus lessen the danger of infection getting into the anterior chamber. I take issue with Dr. Wurdemann in regard to using adrenalin preliminary to making the cataract extraction. Some of the gravest hæmorrhages have followed its use, and I do not believe we can depend upon it as a hemostat. In regard to the preliminary preparation of the eye, I think Dr. Fryer has established a very good precedent. The past year or so I have depended on irrigations of hot boracic acid solutions rather than bichloride solutions. It is impossible to get the conjunctiva free from organisms, but if we can lessen our traumatism, nature will take care of the organism already in the conjunctiva.

J. A. L. BRADFIELD, La Crosse, Wis.: I am heartily in sympathy with the last paper on preparation for extraction. The first thing to be considered is the least possible injury to the eye. Whether we make an iridectomy or a simple extraction, the question is which causes the most injury. When there is a large lens, I believe the iris is more injured by the lens passing through the pupil than it is produced by a simple iridectomy. If Dr. Gifford uses cocaine as he reports, I do not wonder that he has prolapsus, and I should not wonder if he has wounds which do not close. Used as he says I believe it is detrimental to the nutrition of the cornea. The adrenalin is valuable in the ordinary case, and it makes the field much clearer, so I much prefer it. Iridectomy should be made in all cases of those poor patients who cannot let us watch them afterwards, or those coming a great distance; in these cases the anterior capsule should be removed. For simple extraction I suggest the corneal incision with the use of atropia. Use it before the operation and there will be a full, large pupil which will not be injured and iris not dragged into wound when wound opens. Real iridectomies should be made in all cases where there is a heightened tension.

DR. D. T. VAIL (Cincinnati): To discuss these papers anyone could consume an hour instead of five minutes. I wish to mention one or two things not touched upon in these papers. Nothing has been said in reference to holocaine as an anæsthetic remedy. It is more penetrating than cocaine and anæsthetizes the iris much better. I have never found it necessary to inject cocaine subconjunctivally since I began using holocaine. Before its use I had the same experience all have had. If a sensitive iris is grasped the patient cannot refrain from making a squeezing effort, and the usual result is the escape of some vitreous and premature discharge of the lens.

Since I saw some eminent oculists in New York use 1 per cent. holocaine four minutes before the operation and then for two minutes using cocaine, then performing the iridectomy without the slightest movement of the patient, I have resorted to its use in every case.

Occasionally I go back to the old method of making the

corneal incision. If I have a case particularly important, where I want absolutely to get the best results, and fee also, I make the incision corneal and do away with the conjunctival flap. I would advise young operators to avoid conjunctival flaps. I would make the incision in the cornea in my first cases and later on I would adopt this "flap" operation.

In regard to Dr. Goux's case of glaucoma and cataract, I think he attempted too much in extracting in glaucoma where the tension was plus 3. One could not expect anything but the result he had—forcible delivery of the lens, hæmorrhages, etc. I would do a preliminary iridectomy with a small keratome, making the incision well back, and by the *vis a tergo* the iris will spring up into the wound, and it is only necessary to pick up the prolapsed iris and do the iridectomy with the slightest amount of traumatism. This restores the tension of the eye to the normal; later on I would effect delivery of the lens in the usual way. I have followed this method and have succeeded without rupturing the hyaloid membrane.

J. W. BULLARD (Pawnee City, Neb.): I wonder if any of the members present have had the experience with argyrol that I have. I have been using it as a bactericidal agent, and have learned to expect nothing from its use. In purulent conditions of the conjunctiva I have used it day after day without results, the patients returning with the purulent condition, and have gone back to the old nitrate of silver and have stopped the pus. I have not used it in the same way and for the same purpose as has Dr. Fryer, as set forth in his paper. I am wondering if any other member of the Academy has had the same experience I have had. (In answer to the question, I will say that I use it in the strength of 30 per cent.) If he has had the same experience I hope he will be bold enough to state it to this Academy.

ALBERT E. BULSON, Jr., (Fort Wayne, Indiana): The last word on this question of cataract extraction has not yet been said for the reason that we will probably never uniformly agree upon the exact methods of preparing the patient and the kind of an operation to be performed. As a direct result of the better care which the people are giving the eyes by way of proper correction of errors of refraction and attention to other abnormalities, cataracts are becoming less com-



mon from year to year. Notwithstanding the fact that some operators glibly talk of performing from one to two hundred cataract extractions each year, I venture to assert that not one operator in five hundred exceeds twenty to twenty-five cataract operations per year, and the number of reputable and experienced operators who do less will constitute the majority.

Considering that every unfavorable result will have its influence in detracting from the reputation of the operator, it becomes necessary to select that method of operation which gives promise of affording the most satisfactory results for the patient as well as the operator. Very few patients care about the cosmetic difference between a round pupil and one irregular in shape, as produced by an iridectomy, but they do care about the quantity and quality of vision. It seems to be a recognized fact that the combined operation in the average operator's hands is the easiest and safest to perform, and the one less likely to be followed by complications. If this be true we are not giving our patients the best chance of recovering the most useful vision if we adopt an operative procedure generally attended with more risk, and having as its questionable advantage a round pupil. I pride myself upon having secured practically  $20/20$  vision in quite a number of cataract cases in which the combined operation was performed. In a few instances equally good visual results have been secured by simple extraction, but I have had one or two deplorable results in cases in which I performed a simple extraction, and which I am quite satisfied would not have occurred had the combined operation been performed. I therefore think the combined operation is the safest and best for the average operator, and particularly for the large class of ophthalmologists who see but few cataracts each year.

I am not in favor of a preliminary iridectomy several weeks or months before the extraction is performed, as I think with such method the eye is subjected to the influence of infection and other untoward incidents to operative procedures once more than is necessary.

I cannot agree with Dr. Kyle that extended flushing of the eye prior to cataract extraction is essential. In fact, I think that much of the flushing ordinarily done before cataract extraction is detrimental. As Dr. Fryer has pointed out, many pathogenic organisms are beneath the epithelial layer

and cannot be reached by any amount of flushing. Too much flushing only tends to abraid the surface, add congestion and increase the tendency to infection. Our attention might better be directed toward thorough sterilization of the parts around the eye, the instruments and the dressings.

Argyrol is one of our valuable astringents and antiseptics, but I feel sure that the weak solutions ordinarily recommended are of but little use in destroying pathogenic organisms. I have not been able to secure beneficial effects in the eye with the use of solutions of less than 30 per cent, and the solution which I most employ is one of 50 per cent.

For intensifying the anæsthesia and lessening the quantity of cocaine to be employed, I have found it advantageous in the few cases in which I have tried it, to follow Darier's method of injecting cocaine under the conjunctiva following the anæsthesia produced by the first instillation of cocaine. The principal objection to it, so far as I see, is the dull pain following the injection and lasting for some minutes.

MELVILLE BLACK, Denver: I do not believe we will ever convert anybody by these discussions. In looking at the statistics of the subject, they do not vary materially in successful results. I suppose the man who operates along certain lines will continue to do so regardless of what he hears to the contrary. Some months ago I thought I had discovered something, but I found our old friend McKenzie had discovered it fifty years ago. It is hard to discover anything now-a-days. When we read these old fellows we find they did everything we are doing to-day. I refer to a blunt pointed secondary knife I published a little account of in the *Ophthalmic Record*. I do not now claim any priority on the knife, but would suggest that if you provide yourselves with it you will find it convenient in the event of the iris falling in front of the knife during the section. If you do not wish to cut the iris, by withdrawing the linear knife as soon as the iris has fallen in front of it, and replacing it by the blunt-pointed knife, you will find it easy to avoid the iris. My experience is that the iris falls in front of the knife after the counter puncture has been made. A full description of the technic can be found in the February, 1904, *Ophthalmic Record*.

T. C. HOOD, Indianapolis, Ind.: Here we have Dr.

Gifford repeating the well-known recommendation that when we have one eye only we should do the iridectomy, and Dr. Vail saying that when he has a case in which he is particularly interested in getting a good result, he makes the corneal incision. The argument is good in both instances. I do a corneal incision in most of my cases. Like my Ft. Wayne friend, I do not do a great many in a year, but I do a corneal incision in most cases, and I do a simple operation when I can. I avoid iridectomy if possible. If there is a pupil which is sluggish and refuses to dilate thoroughly under cocaine and atropin, I suspect sclerosis of the sphincter pupillæ and that I will have to do an iridectomy; but if it dilates easily, I try to get it out without cutting the iris. If I can, I get it out without much pressure and manipulation.

W. B. BRIGGS, Sacramento, Cal.: In speaking of the ideal operation for cataract, I think there is none that is ideal for all operations and all cases. The personal equation is a large element in deciding on any operation. The operation the man is most familiar with is for him the best. The man who is in the habit of operating successfully by a certain operation should continue to use the same operation. The simplest operation is not, in reality, the so-called "simple operation," which is in many respects more complicated than the combined operation. It took me many years to decide to try the simple operation, and gradually as I have used it more I have been more pleased with the results, and in suitable cases I believe it as near the ideal operation as it is possible to get. But on the other hand, there are a great many cases not suitable for it, and a great many complications that take place at the time of the operation that will make desirable to do an iridectomy. I do not think anybody ought to be too dogmatic in regard to what operation we should advise. We have to vary our procedure as the condition develops during the time of the operation. In regard to Dr. Smith's forceps, I think favorably of them on theoretical grounds. I saw an eminent Vienna oculist using them some years ago, and I thought he was having more cases of prolapse of the vitreous than reasonably accountable for an operator of his skill, and I have never used them myself. Under the doctor's advice that they are not inclined to increase the number of cases of prolapse of vitreous, I shall

be encouraged to try them some time. Dr. Gifford's flap operation I should favor on theoretical grounds, but I shall wait for Dr. Gifford to develop it further before I attempt to employ it.

GEO. F. SUKER, Akron, O.: Theoretically I agree with Dr. Fryer's paper, but practically I do not. In regard to sepsis as a matter of general surgery; firstly, because the eye is an immobile organ, therefore germs will not thrive as well—motion is a contrary factor for the rapidity of bacterial growth. The bacteriological principles employed are not the same as in general surgery. The flow of tears from the lacrimal gland serves as a constant irrigator. If the patient is sleeping and on waking up in the morning you do not find upon microscopic examination in the dry tears in the canthi, a pneumococcus or a diplococcus, but only innocent aerial bacteria, you can make an operation without first excessively flushing. On the contrary, should you have a pneumococcus or a diplococcus, then appropriate treatment should first be given to get rid of them. The quantity of germs has a great deal to do with the rapidity of infection. A certain amount is necessary to produce any inflammatory action or infection. Therefore gentle squeezing of the lids will expose many from the stomata of the border glands. If you find the germs, flush out with a normal saline or boric solution. If you have any lacrimal sac complication, ligate the canaliculus provided the affection is not an acute one. The reason that some fail with argyrol is that they have too strong a solution and they get a precipitation. You must shake your solution and then it will give you a disinfection of the field to which it is applied. The percentage of silver in all of these preparations is apt to be a varying one. The effect of a 2 per cent. carbolic acid solution is practically nil. I would not use it around the face because it is of no value. You can grow germs in a 2 to 10 per cent. carbolic solution and, by serial culture, in a 1-500 bichloride of mercury solution, if you please. (I have proven this and have published a paper on that score). The eye is the only organ to which the general principles of asepsis do not apply as they do in general surgery. You have to modify them. Any wound upon the eye is not on muscular tissue which contracts and dilates. In most instances the eye takes care of the infection, when or-



dinary previous care has been exercised in preparing the field of operation.

J. M. FOSTER, Denver: In regard to the simple operation and iridectomy, it has been well said that it is a matter for individual selection. My experience in both has been favorable. We all get good results with one or the other. There is no one special way to operate an eye for cataract. The point I wish to make has been well brought up by Dr. Smith in regard to the use of his forceps. I have been much pleased in using them the last few years, getting excellent results. I do not get more prolapses than before, the forceps do not lacerate the eye, and you do not have to use atropin to get a large amount of the anterior capsule removed. I recommend it to any who have not tried it. Your results will be excellent.

JOS. BECK, Chicago: I do not rise to discuss the eye papers, but to say a word in regard to what was brought up by Dr. Bullard in regard to the irrigation of the eye. I believe the men who do not disinfect the eye and have good results are the same as the men who do not disinfect the mouth, throat and ear. Disinfection does not take place as rapidly as in other parts of the body. As far as my experience with argyrol is concerned, I have used the stuff strong enough in the nose and throat and yet I know it is not the bactericide it is claimed. In the nose and throat it does little good. Finger, of Vienna, has carried on many experiments and finds that argyrol is not of as much value as our old nitrate of silver, and so far as any good action of argyrol is concerned, the 5 per cent. is as good as 50 per cent., and the rest remains as an inactive substance or is wasted. If it is good in 5 per cent as in 50 per cent. it does not appeal to our reason to use stronger solution. It must be a pretty big and strong bug that can live in the 1-500 bichloride as Dr. Suker stated. My experience in surgery is that a 5 per cent. solution is a good disinfectant. I believe alcohol is better for a disinfectant about the face than a 2 per cent. carbolic solution.

W. L. DAYTON, Lincoln, Neb.: Personally, I believe the ideal operation is the combined operation. I must admit that I have made in twenty-three years but three simple operations. Of course I am prejudiced. I think the operation of greatest safety is the preliminary iridectomy, particu-

larly in cases of immature cataracts. It is true to extract the lens too soon after the iridectomy is dangerous, but I will venture to say that of all the fellows of this Academy not one who has made proper iridectomies has had suppuration to follow. I mean a preliminary iridectomy for the extraction of cataract. In reference to the purse string stitch, I have not used it in the cornea, but I have used a certain stitch in the cornea that brought the parts in closer apposition, and found the result was better in spite of the intense puckering I got with it. With reference to Dr. Smith's capsular forceps, I think it much superior to that of Fuchs, and I imagine there will be less danger of laceration of the anterior capsule.

T. W. MOORE, Huntington, W. Va.: In reference to Dr. Fryer's paper, I wish to call attention to the fact that White, before the American Medical Association, claimed that you could sterilize the conjunctival sac by introducing bichlorid of mercury 1-500 in sterilized vaseline.

DR. EUGENE SMITH, Detroit (closing): I want to make one general statement with regard to the simple extraction: I maintain that a man who has only made three or four in his life is not competent to discuss the subject. I use argyrol two or three days previous to the operation if I find hyperaemia, as we do so frequently in old people, and a few minutes before the operation I drop in a 25 per cent. solution of argyrol. I have seen but one suppuration in five years. I will say with regard to Dr. Goux's paper, that when the anterior chamber is too shallow for preliminary iridectomy, make a posterior sclerotomy, and follow with an iridectomy, as suggested by Dr. Vail. With reference to pain, alluded to by many, I have been in the habit of dropping a solution of cocaine on the prolapsed iris. If not prolapsed, I lift the anterior lip of the wound, drop cocaine on the iris and make the iridectomy absolutely without pain. With regard to the simple or combined operation, both are good. I think the simple is the ideal. I prefer cocaine because it dilates the pupil. It assists me in judging whether or not I can make a simple extraction. Making an extraction through a rigid pupil will be frequently followed by prolapse. The forcible stretching caused by the escape of the lens through the pupil is apt to be followed by relaxation of the circular fibres,

which will favor prolapse. I never have used atropine. I find that prolapse after the simple operation is most frequently due to injury on the part of the patient. I think the minimum of injury is always in the simple extraction. It is one operation instead of two, hence it is the *simpler* operation.

DR. GIFFORD (closing): With regard to the tension of the flap causing the wound to gap, the line of tension is mainly from above downward and tends to hold the flap applied instead of making the wound gap. With regard to conjunctival asepsis, we cannot get these germs out of the sac. When Dr. Fryer thinks he has done so I believe he is much mistaken. I know you cannot do it, and have experimented on this so much that unless the doctor has some contrary experience to show by his own work, I cannot accept the statement that argyrol or anything else will render the sac a septic.

In regard to the dressing, Dr. Reynolds, did you ever get prolapse?

Dr. Reynolds: Rarely.

Dr. Gifford: Then you say it is due to the imperfect dressing?

Dr. Reynolds: To meddlesome interference of the patient.

Dr. Gifford: Then why do you not do something to prevent this? Unless you put on a dressing that will prevent interference of the patient, you have not done all you can do. The nurse may look away, or go to get a drink, and the patient may stick his thumb into the eye or roll over upon it. It is a good thing to have him watched every moment, if the patient can afford it, but you should always put on a dressing that will withstand a considerable blow without transmitting it to the eye, and that does not shift, and that will prevent the patient from sticking his thumb into the eye unless he takes special pains to do so. Some sort of shield fastened with collodium is the only ideal dressing in cataract operation. I was glad to hear Dr. Reynolds advocate opening the capsule with a knife. It avoids introducing an extra instrument into the eye. I use a knife sharpened a half inch on the back as well as the front. I have never had the trouble of escaping aqueous before making the counter puncture. That was the main objection to it. With this knife you can go down to the lower edge of your pupil and then make your counter

puncture, and you get a clean rent and seldom have to do a discession after the extraction of the cataract, although if a discession is done with a sharp knife and subconjunctivally, I consider the danger absolutely nil.

DR. L. J. GOUX, Detroit (closing): Regarding argyrol, I have used both 25 and 50 per cent., but feel convinced that I get as good results with 25 as with 50 per cent. In the throat I have given it up, as I know I get better results with nitrate of silver. It has been a disappointment to me in nasal work. In doing a capsulotomy I use the "Fuchs" forceps, which have a shorter shank than Dr. Smith's, and permit the operator to work in closer proximity.

DR. FRYER (closing): In the opening remarks in my paper I said I was convinced that oculists were not on a par with general surgeons in their antiseptic efforts. I am positive in my opinion since this discussion. The conditions and locations of the bacteria that inhabit the conjunctival sac are misunderstood. Kelly, of Johns Hopkins University, I think it was, took epithelial cells from a surface that had been made absolutely aseptic by bichloride and put these in two different tubes. In one he precipitated the bichloride first and then put the cells in a culture tube. In the one there was a very active growth and in the other none, where the bichloride was in force, simply showing that bichloride had rendered the bacteria in these cells inactive but not dead. You cannot produce their death with the ordinary use of bichloride in the eye for obvious reasons, but you can with the argyrol. One thing with regard to the preparation of all our solutions: You go to the ordinary druggist for distilled water and you get it loaded with microbes. These gentlemen who do not get a positive result from the argyrol and an aseptic condition, do not get pure argyrol to begin with. In other words, it contains many microbes. It will kill them, but you have reduced the strength in this way. I have studied this subject very carefully. Dr. Suker's statement that the motility of the eye will not allow the activity of these microbes is an error, or why should we have the gonococci, etc., so active and destructive? You can render these microbes inert better with argyrol than with bichloride, because the argyrol even in 50 per cent. strength, is harmless to the eye but death to the microbes. I will not take the time to discuss the other papers



to any extent, but Koller, with whom I have talked in regard to the use of cocaine, says that if it is used long enough in weak solution, it will render the iris absolutely free from sensation. It is better than holocain, which, while it anæsthetizes very well, will not do the work cocaine does.

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CENTRAL SUPERFICIAL CHOROIDITIS, REPORT  
OF A CASE.\*

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DISEASES of the fundus oculi presenting lesions recognizable with the ophthalmoscope possess as a rule, principally a diagnostic and pathologic interest. Unless the underlying causative condition be specific disease, the outlook for a cure in alterations of the deeper structures of the eye under every known method of treatment, observes the French therapist, Darier, has been so slight that many practitioners have come to abstain from all serious attempts at any treatment. The case here reported is a fortunate exception, and this may serve as my apology for placing it on record.

One cause of insuccess in the treatment of the affections of the choroid and retina is due to the fact that these delicate structures so rapidly suffer irreparable damage before even the patient is aware of the gravity of his disease; destruction of anatomical elements and an indelible cicatrix are the consequences.

It is quite intelligible, when the anatomical, especially the vascular and consequent nutritive relations which subsist between the inner layer of the choroid (chorio-capillaris) and the outer layer of the retina (the percipient elements, the rods and cones) are considered, that the retina is so generally involved when the choroid is affected, so that in many cases it is necessary to denominate the disease by a term which includes both membranes.

X. Y., a lady aged 30, began to notice that the sight of the right eye was blurred about February 20, 1903, attention being prominently drawn to the defect by the patient's occu-

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\*Read at the 9th meeting of The American Academy of Ophthalmology and Oto-Laryngology held at Denver, Aug. 24th to 26th, 1904.

pation, that of an oculist using the ophthalmoscope and retinoscope daily. Nevertheless at that time the vision was found to be full in amount. The defect was described as a blur of the object fixed with that eye, the surroundings being clear as usual.

Examination with the hand ophthalmoscope at this time failed to show any lesion, the symptom being regarded as of nervous origin. Two weeks later the vision had fallen to  $\frac{5}{8}$ . At times the pupil of the right eye was twice as large as the left.

The ophthalmoscope now showed some increased depth of color in the macular region. The symptoms persisted and the vision continued to grow worse, falling to  $\frac{5}{15}$ . About this time the patient was seen by Dr. H. F. Hansell. Thorner's ophthalmoscope showed slight swelling and deeper color of the macula. Examination by Dr. M. F. Butler revealed the presence of some purulent discharge from the sphenoidal sinus on both sides. The affection of the sinus was regarded as in some way connected with the macular lesion. The blurred vision continued for several weeks. At the end of this period, the vision began to improve quite rapidly. The ophthalmoscopic appearance became more pronounced, consisting of a number of yellowish white plaques—half a dozen—in the macular region. At this time the patient was seen by Dr. Edward Jackson, who was inclined to regard the plaques as situated in the choroid, as they undoubtedly were. The vision continued to improve up to final complete recovery. The ophthalmoscopic findings now consisted of faint yellowish markings in the macular region.

January 19, 1904, eleven months after the onset of the trouble, the patient says that she feels as if there was still "something wrong," although when trial is made of the eye, the object fixed comes out clearly. Vision is  $\frac{5}{5}$  mostly.

The macular region O. D. is occupied by half a dozen yellowish plaques looking as if the full red of the fundus reflex had been bleached out.

June 16, 1904, the yellowish white plaques are still visible but much fainter. The patient says she "feels as if the right eye had to make a greater effort to see than the left." She involuntarily closes the right to rest it, but continues her work without special trouble.

The fields are normal for form and color.

The treatment consisted in abstention from use of the eyes for a few weeks and atropine; profuse general sweating was excited by daily hot baths.

There are two points of special interest in this case of fundus lesion. The first relates to the tissue affected. We were at first inclined to consider it a lesion of the retina, standing in some, but not obvious, relation with the purulent affection of the sphenoidal sinus; but the subsequent development of the yellowish plaques in the macular region makes it about certain that the lesion was in the choroid. It seems undoubtedly to belong to the class of obscure choroidal conditions not yet perfectly classified. Of these, Juler, for example, observes that there are many rare ophthalmoscopic appearances of the choroid which are extremely difficult to classify, as they overlap each other to a considerable extent, and as their pathology is still very obscure. The case here reported is of the variety known as central guttate choroiditis. This form appears to have been first described in England by Mr. Hutchison; it is generally known as Tay's choroiditis. Some of these cases show other changes of the fundus. In most of them, as also in the one here reported, the fovea is less affected than the surrounding region. In many, too, the visual acuity is scarcely at all affected. In connection with these types of choroidal disease affecting the macular region, the so-called retinitis circinata of Fuchs is to be mentioned. While ophthalmoscopically an affection of the retinal structures, microscopical sections have shown marked disease of adjacent choroidal vessels. The subjects of these types of central disease are usually advanced in years. Nettleship, in a paper calling attention to the relation of the choroidal arteries and some forms of localized choroiditis and retinitis asks the question, "Has any one watched the onset of Tay's guttate central choroiditis and seen it either increase or diminish?" He rather suggests a negative answer, though he seems to believe that in one case he was able to determine that the disease had spread over a wider area and that the individual spots had become decidedly larger. In my case we could clearly follow the evolution of the affection from the period when the only visible change consisted of a certain œdema of the macular region to the development of the plaques with the subsequent fading of the same, until their almost complete disappearance. So that at present, it would probably be difficult for an observer who had not seen them when they were well marked to discover them.

In the absence of any constitutional taint, to what cause are these forms of disease of the macular region to be referred?

Nettleship believes that disease of the posterior ciliary arteries is responsible for these macular affections. Both the choroidal and retinal capillary network of the macula is extremely close, much closer than in any other part of those structures, so that the rapidity of the blood stream is influenced in a greater degree by the condition of the larger arteries which supply it, than where the meshes are coarser: Thus we can understand why, in consequence of endarteriitis or other change of the arterial wall narrowing the lumen of the vessel should affect the macular region especially rather than the more peripheral portions.

In the case reported, the patient was firmly convinced that prolonged, perhaps excessive, use of the eye with the ophthalmoscope and the plane mirror had something to do with her complaint.

Lesions of the fundus from direct exposure to the sunlight as during an eclipse, are well known. The usual results of over-use of the eyes show themselves in asthenopias and hyperæmias that we are all so familiar with in daily practice. Nature usually gives strong hints in this way before the danger line is reached. But cases have been reported from time to time of serious organic lesion directly traceable to over-use.

Upon the discovery of the sinusitis we were at first inclined to ascribe to it the cause of the macular affection; but we have since thought that this was an accidental complication, especially as the ocular disease subsided while the affection of the sinus continues.

#### DISCUSSION.

EDWARD JACKSON (Denver): I saw this case about the time vision was beginning to improve, and the macular changes were becoming positive. At that time any one would think he had to deal with patches of choroidal exudate. The appearance was that seen in the early stage, and comparatively slight, but still unmistakable. It is an interesting case, and of great value from the fact that it has been followed through its whole course. We have all seen changes of the macula with the decided change of vision, and a case of this kind seems to throw great light upon their mode of origin.

DR. SCHNEIDEMAN: I forgot to say that the patient is a perfectly well young lady, and without history. The urine, repeatedly examined, was negative. Nothing was suggested as to the cause of the fundus lesion.